

WHAT IS CLAIMED IS:

1. A method for aligning the optical beam path of a microscope, having a light source (1), a microscope optical system, a detection stop (12), and a detection device (13),  
 5 wherein the method comprises the steps of:
  - A) providing the detection stop (12) as a first optical reference point; and
  - B) providing a second reference point wherein the entire beam path is defined at the two reference points or in two planes.
- 10 2. The method as defined in Claim 1, characterized in that the light source (1) is a point light source.
3. The method as defined in Claim 1, characterized in that the reference points are located in planes conjugated with one another.
- 15 4. The method as defined in Claim 1, characterized in that the planes are Fourier planes.
5. The method as defined in Claim 1, characterized in that the second reference point is an objective pupil (9).
- 20 6. The method as defined in Claim 1, characterized in that all optical elements are aligned with respect to the reference points or planes.
7. The method as defined in Claim 1, characterized in that the method is an iterative  
 25 alignment method.
8. The method as defined in Claim 1, characterized in that the light source is displaced laterally for alignment.

9. The method as defined in Claim 1, characterized in that the plane in which the light source lies is a plane corresponding to the plane of the detection stop (12).

10. The method as defined in Claim 8, characterized in that the lateral displacement of the light source is accomplished by way of a lateral displacement of the illumination stop (3).

11. The method as defined in Claim 1, characterized in that the microscope is a confocal microscope.

12. A microscope assemblage, having a light source (1), a microscope optical system, a detection device (13), a detection stop (12) defining a first optical reference point and a second reference point wherein that the entire beam path is defined at the two reference points or in two planes.

13. The microscope assemblage as defined in Claim 12, characterized in that the light source (1) is a point light source.

14. The microscope assemblage as defined in Claim 12, characterized in that the light source (1) is a laser resonator defining a resonator light bundle.

15. The microscope assemblage as defined in Claim 14, characterized in that the focus of the resonator light bundle of the laser resonator in the laser resonator serves as the intra-laser point light source (19).

16. The microscope assemblage as defined in Claim 13, characterized in that the point light source is constituted by an extra-laser focus (18).

17. The microscope assemblage as defined in Claim 16, characterized in that the extra-laser focus (18) is generated by focusing the illuminating light with a lens (2) or a hollow mirror.

5 18. The microscope assemblage as defined in Claim 12, characterized in that the reference points are located in planes conjugated with one another.

19. The microscope assemblage as defined in Claim 18, characterized in that the planes are Fourier planes.

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20. The microscope assemblage as defined in Claim 12, characterized in that in addition to the detection stop (12), an objective pupil (9) serves as a reference point.

15 21. The microscope assemblage as defined in Claim 12, characterized in that all optical elements are alignable with respect to the reference points or planes.

22. The microscope assemblage as defined in Claim 13, characterized in that the point light source is displaceable laterally for alignment.

20 23. The microscope assemblage as defined in Claim 22, characterized in that the lateral displacement of the point light source is accomplished by way of a lateral displacement of the illumination stop (3).

25 24. The microscope assemblage as defined in Claim 16, characterized in that in the extra-laser focus (18) of the point light source defining the illuminating light beam is laterally displaced by lateral displacement of the laser together with a focusing lens.

25. The microscope assemblage as defined in Claim 24, characterized in that the extra-laser focus (18) defining the illuminating light beam is laterally displaced by rotation of the laser about the pupil of the focusing lens.

5 26. The microscope assemblage as defined in Claim 13, characterized in that for alignment, the illuminating light beam is rotated or tilted about the location of the point light source.

10 27. The microscope assemblage as defined in Claim 26, characterized in that the illuminating light beam is rotated or tilted about the illumination stop (3).